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Session 14: Transhumanism

Changing Times

In 1965 Gordon Moore, in what is now a landmark paper, discovered a pattern in computer technology. Simply put, Moore said that the speed and capacity of computing doubles every 18 months. This prediction has been faithfully tested for the last fifty years, and the pattern with very few and minor deviations has proven to be correct.

During those fifty years, however, a great deal has changed. The cell phone in your pocket, for example, is tens of thousands of times more

powerful than MIT's supercomputer from 1983, which occupied the entire floor of a building.

Computers are not just smaller and faster and cheaper, however. They are smarter. The first computers in the 1940s were already better and more accurate at arithmetic than humans, but humans have historically outpaced computers in almost all other areas. However, things are changing. And today the gap is closing very rapidly, indeed. Computers can now understand speech, recognize objects, follow logical operations, anticipate the needs of humans and offer solutions, and strategize regarding future events. It used to be that scientists said, "Sure, computers can calculate, but they can never beat us at chess." Then computers beat us at chess. "Yeah, but they can't drive a car." Now computers can drive a car across the country back and forth and the only accidents they get in are the fault of human drivers on the road with them. Now we say, "yeah, but computers cannot be self-aware, they cannot be conscious." However, many are beginning to question this notion too.

As transhumanist philosopher, Max More, put it, "Any activity, any behavior which we sufficiently understand we can program a computer to do." Until relatively recently we knew absolutely nothing about consciousness, but that too has changed.

Computer scientists working on artificial intelligence have begun borrowing from the brain, both figuratively and literally. Figuratively, scientists have taken the fact the network of neurons in the brain and the pathways they form are not identical in each individual and applied the same sort of open neural network to computer systems. The neural networks are not deterministic; that is, the computer is not programmed to do one thing or another. Instead, the computer chooses what to do based upon sensory information. For example, Mark Tilden, and artificial intelligence researcher, built robot bugs with computer neural network brains and nervous systems. Even though the machines were not "taught" to do anything in particular, when they were powered on they went through a momentary epileptic fit before

rapidly programming themselves. Within a few seconds the robots were walking around and interacting with objects.

Carl Sims, an AI programmer, created a software program in which simple digital creatures with random body plans and no internal behavioral programming with the exception of an “instinct” to be attracted to a green cube were set loose to see what happened. The results were astounding. The creatures learned to move, optimize their motion based upon their rudimentary kinematic capabilities, find the green cube, and navigate toward it—all without having any programming to instruct the creatures about what to do. Sims then put multiple creatures in the same environment and watched the behavior. In each case the simple creatures attempted to get the green cube, take it from other creatures, and keep it from the rest. Then something phenomenal happened: one creature crawled past the green cube and attacked the other creature before returning to the cube later. None of these behaviors were pre-programmed. This attacking creature had gained an advantage over the other creatures. It had evolved intelligence.

But neural architecture on computer chips is not the only way that scientists are borrowing from the brain. They are also taking neurons from the brain and building computer chips out of them. Thomas De Marse from the Department of Biomedical Engineering at the University of Florida has grown living brain cells on a computer chip. His studies have found that each chip is unique and has a certain personality. He can blindly tell which brain neuron chip is in the computer simply by the strengths, weaknesses, and behavior of the non-deterministic programs which the chip is controlling. His brain chips have learned to play simple video games and even maintain the pitch and roll of an airplane in flight. The actions of these brain chips are limited to the architecture of the computer chip, but are autonomous.

The holy grail of artificial intelligence and computer consciousness is what is called the Turing Test. A computer is said to be intelligent if a human being cannot tell whether he or she is talking to another human or to a computer. Over the years, many AI systems have at-

tempted to pass the Turing Test, but none had ever done so. Then in 2014, Eugene passed the Turing Test. Participants in the study could not tell whether they were speaking to a human being or a machine.

For many scientists, philosophers, researchers, executives, and politicians these facts and many others have worked together to confirm the existence of The Singularity.

Singularity

What is The Singularity? Simply put, The Singularity is the seemingly inevitable point at which computers become more intelligent than human beings. According to theorists, like Google executive, Ray Kurzweil, the intelligence of computers is doubling every 18 months while human intelligence is at best growing at a rate billions of times slower. He and many other like-minded individuals recognize this as a serious problem. As PhD Mathematician Vernor Vinge put it,

“It’s a problem we face every time we consider the creation of intelligences greater than our own. When this happens, human history will have reached a kind of singularity — a place where extrapolation breaks down and new models must be applied — and the world will pass beyond our understanding. Within thirty years, we will have the technological means to create superhuman intelligence. Shortly after, the human era will be ended.”

According to many scientists today, the day is quickly approaching when super-intelligent computers can program even more powerful super-intelligent computers unaided by humans, a process which will continue at a runaway rate, doubling in capacity every 18 months. Does this have to be a problem? I. J. Good, a British mathematician, put it well when he said,

“Let an ultraintelligent machine be defined as a machine that can far surpass all the intellectual activities of any man however clever. Since the design of machines is one of these intellectual activities, an ultraintelligent machine could design even better machines; there would then unquestionably be an ‘intelligence explosion,’ and the intelligence of man would be

left far behind. Thus the first ultraintelligent machine is the last invention that man need ever make, provided that the machine is docile enough to tell us how to keep it under control.”

Nevertheless, Kurzweil and other like-minded thinkers are tremendously optimistic in the face of this eventuality. Why? Because humanity can see it coming and we can take the necessary steps to merge humans and computers and evolve together. As MIT Cognitive Scientist, Marvin Minsky, put it:

“Will robots inherit the earth? Yes, but they will be our children. We owe our minds to the deaths and lives of all the creatures that were ever engaged in the struggle called Evolution. Our job is to see that all this work shall not end up in meaningless waste.”

They call this co-evolution, man mingling with machine, Transhumanism.

Transhumanism

The coming Singularity is not the only rationale driving the co-evolution of computers and humans. Although the Singularity is receiving a great deal of attention, funding (literally billions of dollars), research, and planning, it is possible if not probable that there exists a more basic human drive toward Transhumanism. As Transhumanist Philosopher, David Pearce outlines the movement,

“People are transhumanists if they believe in the use of science and technology to overcome our biological limitations. This can be broken down into three supers: super-intelligence—to radically enhance intellectual capacities; super-longevity—there is no physical law that says that biological robots [humans] have to grow old faster than silicone robots; and, finally, super-happiness—this is the idea that we can use biotechnology to phase out the substrates of suffering.”

In other words, Transhumanism provides the opportunity for humans to be superhumans, super smart, super healthy, and super happy. Imagine the sense of well-being humans will enjoy when they are not

constantly battling sickness and disease, when they are not limited by human intelligence, can access information instantly from anywhere, and can multiply their productivity immeasurably—resulting in a more rewarding work-life and free time. Imagine the advantages that our children will have over previous generations.

The big question that remains unanswered, however, is this: do scientists have the ability to integrate humans and computers with one another? The answer to this question appears to be, yes.

Neuroscience

In 1963 neurosurgeon Robert J. White successfully isolated a still living and conscious brain from the body and succeeded in transplanting a head from one monkey to another. He said in a 2003 interviews,

“If you take the brain out, and isolate it, and keep it alive, you can live forever. Scientists have successfully taken the heart, the liver, the lungs out of the body and keep them alive, but no one had been successful with the brain. We have to remember that the brain is very delicate when it comes to its blood supply. And so when we finally did it and found that this brain of a highly developed animal had brain waves, had biochemistry, was functioning just as it would....now we couldn’t talk to it, but we could send it electrical signals; we could show that it could actually hear...but the point of it all is that that moment in time said to all of us if you can do it for the animal brain, you can do it for the human brain. So consciousness can be transplanted, personality can be transferred, the question goes, what does this mean about the human spirit or soul. And we can argue, I guess it can be transplanted.”

This is only the beginning, scientists have now mapped large portions of the brain. In some cases portions of the hippocampus or thalamus can be completely removed and replaced with computer chips that share the same architecture as the removed portion of the brain—all of this without any noticeable change in brain function.

Further, Yang Dan from the University of California, Berkeley has used cranial implants and external measuring devices to tap into the visual

cortex of the brain. Now what a person or animal sees in the brain can be shown on a television screen, recorded, and then reimplanted later. And it is not only visual information that is being stored and reimplanted but also memory information. Scientists have successfully reimplanted forgotten memories in various mammal species. Plans are already in the works to re-implant memories in Alzheimer's patients and even implant memories of how to carry out a specific task in the brains of people who have never done the task before.

In a 2014 Russian Times interview, astrophysicist Michio Kaku said that work is underway to create a neural internet, a kind of Brain Net that would allow individuals to telepathically communicate with one another through the integration of the brain and web servers. He said that forgetful drugs have already been developed, which would allow certain memories to be forgotten if desired, and are just awaiting FDA approval. In development are super-memory drugs and super-intelligence drugs, Kaku said.

Robotics

These discoveries in neuroscience are already finding their way into the field of robotics. Veterans with missing limbs are participating in trials which replace their missing limbs with robot appendages. These robotic limbs are far more than aesthetic accoutrements; they are function limbs controlled by the brain of the amputee.

These limbs are stronger, tougher, and more durable than our human limbs, and in some cases even more functional. Limbs are being developed that might extend the reach of the arm, allow people to run and superhuman speed and jump superhuman heights, lift vastly more weight.

The technology, in fact, is so advanced, that scientists plan to make a major showing of the technology at the 2016 Olympic Soccer (football) competition in Brazil. They plan to have a quadriplegic in a brain synced robotic exoskeleton walk out onto the field and open the games.

The truth, however, is that neuroscience and robotics have hit a bit of a wall. Human tissues tend to reject computer implants. But scientists are working on this problem too.

Genetic Engineering

Scientists now believe that it is possible to get around some of the tissue rejection problems as well as many of the biochemical/bioelectric communication issues through genetic engineering. By changing the human genome, scientists hope to bring humans and computers closer together and at the same time fix many of the problematic genetic mutations that make humans susceptible to disease. As Eric D. Green, Scientific Director of the National Human Genome Research Institute put it:

“Fundamentally it is about determining the complete sequence of the human genome, the three billion letter that make up our genetic blueprint. Now we know we have the code before us and it is a digital code. Buried within that code is information about all the genes necessary for making a human brain....And now the fun stuff begins because we get to start to crack that code.”

This technology is now allowing human organs to grow inside domesticated animals like pigs and mice, a practice which is taking place across the country today and work continues on cloning human beings for the purpose of replacement organs.

Formerly, it was only possible to change the DNA of future generations, leaving adults alive today stuck in the genetic past, but that reality is now gone, and a new reality exists. Today viruses are being genetically engineered to insert DNA into the genome, and an even more advanced technology called CRISPR is using the codon specific splicing capabilities of bacteria to change the genetic structure of the a living being letter by letter. In 2013 biophysicist at UCLA Gregory Stock said,

“We are now becoming the objects of conscious design, and the implications of that are just enormous because until now we have been reshaping

the world around us. We can see how dramatically it's been changing. But somehow we imagined that we were going to remain the same, that we, ourselves, were not going to be caught up in this process. And that is not, in fact, true. We are going to remake ourselves, and it will rip free all of the anchors, which have until now, told us who we are as human beings. We're at the end of the definition of what a normal human being is."

Transhumanist philosopher, Max More, sums it up this way,

"I think increasingly we are going to start realizing that this body is not sacred, that the way we are is not some God-given plan. It's really a pure random accident; we take two sets of genes and we shuffle them, and something comes out—sometimes it's a wonderful product, sometimes it has a hole in the heart, sometimes it has psychosis or tendencies toward extreme anger, has addictive problems, can't concentrate—all kinds of defects. To say that this is sacred is just absurd; it's random, there is no plan there. So genetic engineering, it seems to me, is one of the most moral things we can do."

Gregory Stock continues from above,

"You can rearrange the human body and make humans fly. This is not just about taking an injured human and returning him to normal, but taking a human and making him superhuman—making him go beyond. Our future is not in trying to hold back genetic engineering but to use it in a way that best serves us. If our children can be more intelligent, and healthier, and live longer lives through altering our genetics, why would we not want to do it? Imagine if other children could live for two centuries and if you could only live for eighty years because your parents believed it was improper to tamper with human genetics. You would not be pleased with that decision."

David Pearce, Transhumanist Philosopher

"If you're thinking, are there all sorts of things that could go wrong, pitfalls, yes. But each child is a unique genetic experiment."

Ray Kurzweil, Transhumanist and Google Executive

"Evolution creates structures and patterns that over time are more complicated, more knowledgeable, more intelligent, more creative, more capable

to communicating higher sentiments like love. God has been described as having these qualities without limit. I think evolution is a spiritual process...we will become more god-like."

Dr. Richard Seed, geneticist, world-famous and leading Transhumanist, who is actively working on human cloning, declared in 2011:

"We are going to become gods, period. If you don't like it, get off. You don't have to contribute; you don't have to participate. But if you are going to interfere with me becoming god, we will have warfare."

This Just In

Transhumanism, like all technological enterprises, is a quick-moving and ever-changing subject. Although I have been following the Transhumanist movement for almost a decade, and I started putting this session together months ago, much of the research had to be redone in light of the rapidly changing landscape.

Just within the last week we have learned that DARPA (The Defense Advanced Research Projects Agency) has formally begun testing computer chips implanted in soldier's brains, chips which have already been implanted in military volunteers. Late in April we learned of a growing black market among wealthy Americans for brain implant technology that will allow them to search and access the web just by thinking. Within the last two weeks we have learned in leaked documents that the state of Texas medical board is moving forward with plans to limit access to certain prescription drugs to those patients who accept a "DNA Chip," a chip which confirms that the DNA of the patient matches the identity of the individual each time a prescription is filled.

Perhaps the most disturbing development of the last week is the formal announcement of The Human Genome Project 2, which is now concerned not with mapping the human genome but with creating a synthetic human genome with the aim to create the first synthetic human.